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VOL ISS 350
INFORMATION REPORT O-X- (1981)

Forest Insect and Disease Conditions in Ontario, 1982

G.M. Howse, P.D. Syme, H.L. Gross, D.T. Myren, J.H. Meating, M.J. Applejohn and K.L. Smith

Information Report O-X-350
Great Lakes Forest Research Centre

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The program conducted from the Great Lakes Forest Research Centre and its various field stations and research areas is aimed primarily at overcoming the major difficulties of forest management in Ontario. These problems are continually assessed by the Canada–Ontario Joint Forestry Research Committee, made up primarily of senior members of the Centre and the Ontario Ministry of Natural Resources. This committee ensures that the research resources of both agencies are deployed in a coordinated, cooperative manner in improving forest production and protection, environmental quality and urban forestry.

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FOREST INSECT AND DISEASE CONDITIONS IN ONTARIO, 1982

G.M. HOWSE, P.D. SYME, H.L. GROSS, D.T. MYREN,
J.H. MEATING, M.J. APPLEJOHN AND K.L. SMITH

GREAT LAKES FOREST RESEARCH CENTRE

CANADIAN FORESTRY SERVICE

DEPARTMENT OF THE ENVIRONMENT

1983

INFORMATION REPORT O-X-350

©Minister of Supply and Services Canada 1983
Cataloque No. Fo46-14/350E
ISBN 0-662-12584-3
ISSN 0704-7797

Copies of this report may be obtained from:

Great Lakes Forest Research Centre
Canadian Forestry Service
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ABSTRACT

This report reviews the status of forest insects and diseases in Ontario in 1982 and gives, for some pests, a forecast of conditions for 1983. Seven major forest insects (three conifer and four deciduous insects), six tree diseases (three conifer and three deciduous) are discussed in detail: many other noteworthy insects and diseases are listed in tabular form. Special surveys and insect control programs conducted in 1982 are described. More detailed information is available on request from the Great Lakes Forest Research Centre.

RÉSUMÉ

Les auteurs font le point sur les insectes et les maladies des arbres en Ontario en 1982 et présentent pour certains ravageurs des prévisions pour 1983. Sept insectes importants (trois ravageurs des conifères et quatre des feuillus) et six maladies (trois des conifères et trois des feuillus) font l'objet d'une analyse détaillée, et la situation quant a beaucoup d'autres insectes et maladies dignes de mention est décrite sous forme de tableau. Des programmes spéciaux de répression réalisés en 1982 sont examinés. Des données plus détaillées peuvent être obtenues au Centre de recherches forestières des Grands Lacs.

ACKNOWLEDGMENTS

The authors of this report wish to acknowledge the contribution of all members of the Forest Insect and Disease Survey Unit at the Great Lakes Forest Research Centre, the support and cooperation of the Ontario Ministry of Natural Resources and the assistance of Dr. G.G. Grant, Forest Pest Management Institute, who provided traps, pheromone baits and technical advice.

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INTRODUCTION

The primary objective of the Forest Insect and Disease Survey Unit (FIDS) at the Great Lakes Forest Research Centre is to provide accurate and timely information on the kind, severity, extent and impact of forest insect and disease problems in Ontario. This objective is accomplished through a process of field and laboratory activities that involves detection, identification, evaluation and prediction of forest pest conditions in the province. Basically, the information collected is used to develop and adjust federal forest protection research programs and to assist in the improvement of provincial forest management and protection practices. In addition, the FIDS Unit has a number of other closely related responsibilities including assistance to the province on pest control operations, public pest extension services, assistance in plant quarantine activities and the conduct of special surveys as necessary. The Unit also does research in sampling methodology, damage appraisal and other areas to improve its own efficiency and to assist in a national effort to develop better pest surveys.

In 1982, insect and disease survey technicians (rangers) were in the field from early May to late September (southern Ontario, 10 May-17 September and northern Ontario, 17 May-24 September). The field season was approximately 19 weeks on the average although several rangers were in the field one or two weeks longer. The cooperative aspects of this type of activity are worth special mention. The support and cooperation of the Ontario Ministry of Natural Resources (OMNR) at all levels, districts, regions and headquarters, are particularly noteworthy. The provision of several hundred hours of flying time and other forms of aid enable the FIDS unit to do a better job than would otherwise be possible.

This report is a summary of the records and reports submitted by survey technicians who were assigned as follows to OMNR forest regions in the 1982 field season.

M.J. Thomson and C.G. Jones	Northwestern
W.D. Riggs and V. Jansons	North Central
L.S. MacLeod, W.A. Ingram and D.C. Constable	Northern
K.C. Hall (retired 29 October 1982) and E.J. Czerwinski	Northeastern
H.J. Weir and H. Brodersen	Algonquin
R.J. Sajan	Eastern
H.J. Evans and C.A. Barnes	Central and Southwestern

Other staff of the Forest Insect and Disease Survey Unit for the 1982-1983 fiscal year were as follows:

M.J. Applejohn, Chief of Survey Field Technicians

M.J. Davidson, Stenographer (retired 29 October 1982)

E.B. Dorworth, Mycology, Culture Technician

H.L. Gross, Pathologist

G.M. Howse, Entomologist and Unit Head

H.D. Lawrence, Insect Control Technician

R.K. McCron, Damage Appraisal Technician

J.H. Meating, Insect Control Officer

Z.M. Moynan, Stenographer

D.T. Myren, Mycologist

D.B. Roden, Insect Damage Appraisal Officer

L. Cree, Curator, Insect Collection and Herbarium

K.L. Smith, Insect Identification Officer

P.D. Syme, Entomologist

MAJOR FOREST INSECTS

Conifer

Spruce Budworm (**Choristoneura fumiferana** [Clem.])

In 1982, major changes occurred in the spruce budworm situation in Ontario (Fig. 1). The overall area suffering moderate-to-severe defoliation totalled some 8,023,000 ha, a decrease of slightly more than 10 million ha from 1981 (Table 1). As expected, the area within which budworm-associated tree mortality occurred continued to increase in 1982 (Fig. 2), and now covers approximately 11.63 million ha (Table 2).

In this report the budworm situation is described within three major geographical areas of the province as follows: southern Ontario (primarily Algonquin Region), northeastern Ontario (Northeastern and Northern regions) and northwestern Ontario (Northwestern and North Central regions). In Ontario, the principal hosts of spruce budworm are balsam fir (**Abies balsamea** [L.] Mill.), white spruce (**Picea glauca** [Moench] Voss) and black spruce (**Picea mariana** [Mill.] B.S.P.).

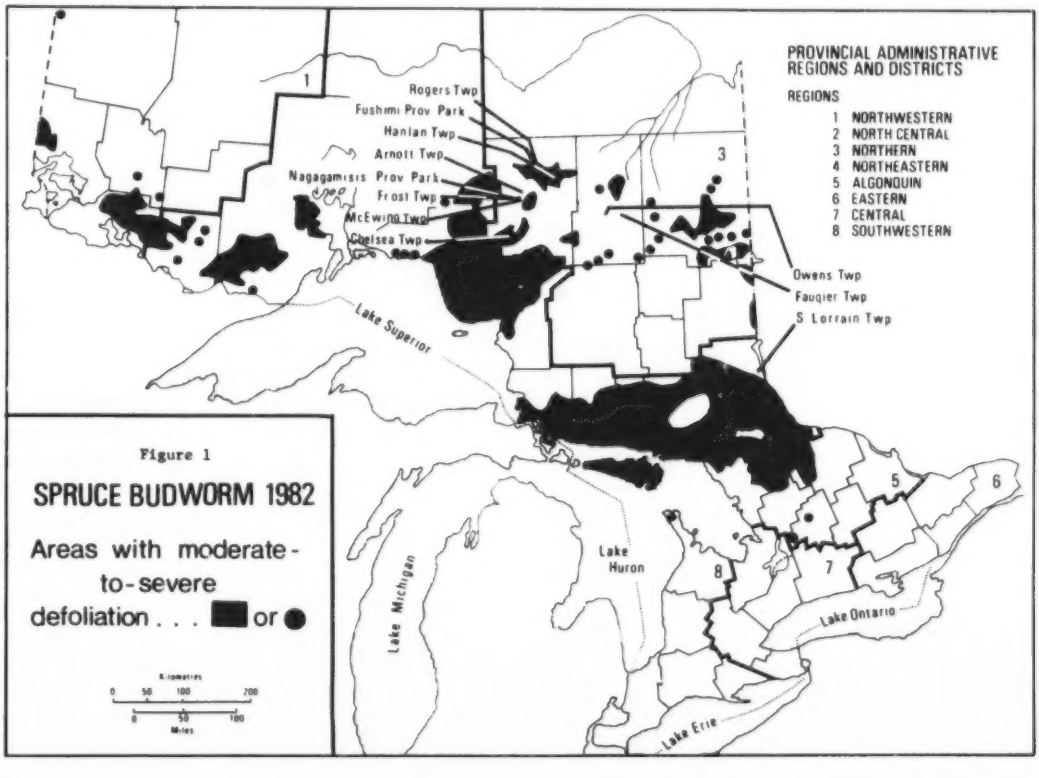
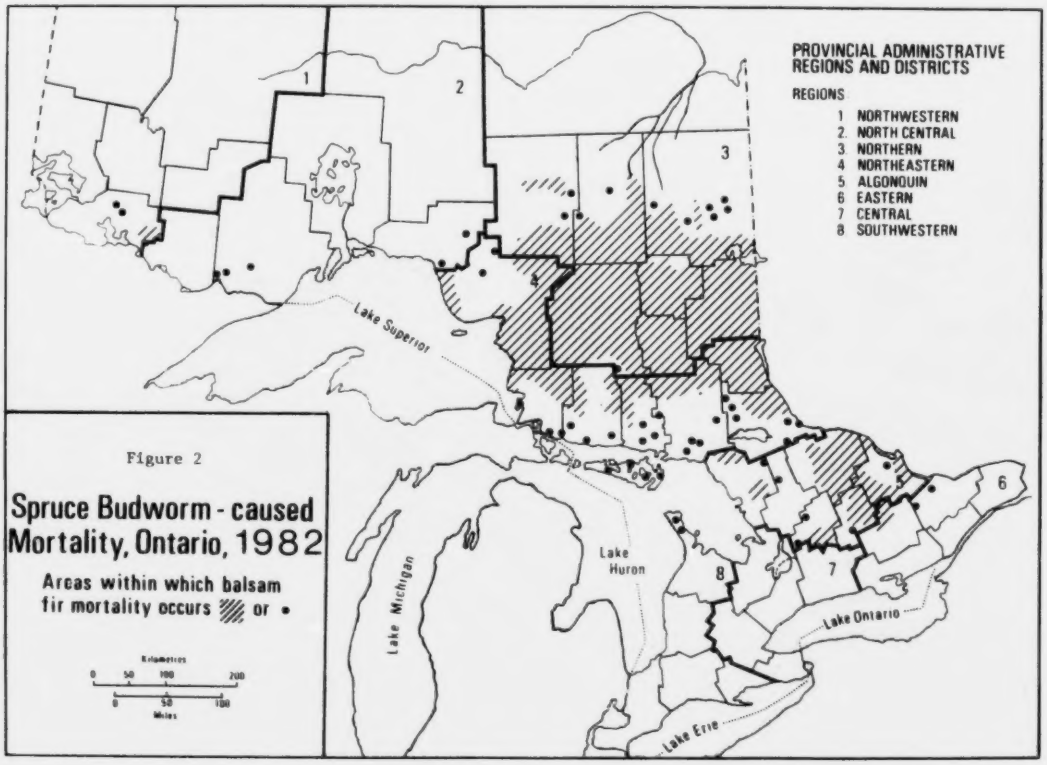


Table 1. Comparison of the area of forest in Ontario defoliated by spruce budworm in 1981 and 1982.

Outbreak region	Gross area of moderate-to-severe defoliation (000,000 ha)		
	1981	1982	Change
Northwestern	.658	.931	+ .273
Northeastern	16.958	6.669	- 10.289
Southern	.601	.423	- .178
Total	18.217	8.023	- 10.194

Table 2. Comparison of the area of budworm-associated tree mortality in Ontario in 1981 and 1982.

Outbreak region	Gross area of budworm-associated tree mortality (000,000 ha)		
	1981	1982	Change
Northwestern	0.088	.150	+ .062
Northeastern	9.572	9.934	+ .362
Southern	1.550	1.550	0
Total	11.210	11.634	+ .424



In 1982, temperatures remained cool during April following a severe winter. Warmer than normal temperatures in early May resulted in budworm emergence during the first week of May in the vicinity of North Bay and during the second week of May near Hearst. Budworm larval development proceeded somewhat ahead of normal during the latter part of May and early June. The latter part of June was cooler than normal, and indeed was the coolest June on record for some locations in Ontario. As a result, budworm development reverted to normal or slowed to less than normal.

In northwestern Ontario, the area of moderate-to-severe defoliation increased by some 273,000 ha this year for a total of 931,000 ha. The infestation in Fort Frances District between Bennett Township and Lower Manitou Lake and the infestation between Kawnipi Lake in Atikokan District and Lower Shebandowan Lake in Thunder Bay District each increased in area by about 70,000 ha. The infestation in the Poshkokagan Lake area of Thunder Bay District expanded to the north and southwest and now totals some 124,500 ha. Small infestations in the Sandstone Lake and Arrow Lake areas of Thunder Bay District merged to form a single infestation as did the infestations in the Wolseley and Beaverhouse lakes area of Atikokan District. Several new infestations totalling 46,689 ha were discovered in Kenora, Fort Frances, Dryden and Atikokan districts in 1982.

In northeastern Ontario the total area of moderate-to-severe defoliation was 6.67 million ha in 1982, a decline of 10.29 million ha from the 16.96 million ha of a year ago. Populations declined throughout a large area in the central part of the outbreak which stretches from Lake Superior to the Quebec border. Low budworm populations were present on host trees within this area. Current defoliation in most stands was far less than had been expected on the basis of 1981 egg-mass counts. The reasons for this are not known but it is suspected that larval mortality was unusually high and furthermore, the area had been affected by cold and snow in June 1980. This development effectively split the area of moderate-to-severe defoliation into two large portions: the southern portion which includes the area from Sault Ste. Marie to North Bay, and the northern portion which includes eastern Terrace Bay District, most of Wawa District and smaller portions of southeastern Geraldton District and southwestern Hearst District. In addition, approximately 60 pockets of defoliation totalling more than 600,000 ha are scattered throughout the Northern Region.

In southern Ontario, the infestation decline which began in 1981 continued in 1982. Changes around the edge of the main body of infestation resulted in a decline of 150,650 ha in the Parry Sound, Bracebridge and Algonquin Park districts. Some 31 scattered pockets of medium-to-heavy infestation totalling 4,822 ha remained in the southern Bracebridge and Minden districts. Two small pockets of medium-to-heavy infestation persisted in St. Edmunds Township, Owen Sound District, along with a single area of medium infestation in West Oxford Township, Aylmer District. Elsewhere in southern Ontario populations were low and damage was negligible.

As mentioned earlier the area of budworm-associated tree mortality continued to increase in 1982. The overall increase of 424,000 ha in the area of tree mortality was considerably less than expected. No new areas of tree mortality were found in southern Ontario whereas the area of mortality increased by 362,000 ha in northeastern Ontario. In northwestern Ontario tree mortality increased in Fort Frances District and was mapped for the

first time in Thunder Bay District. There was an overall increase of 62,000 ha for a total of 150,000 ha.

In the 1981 report, estimates were given of the impact budworm had on the three major hosts in Ontario between 1977 and 1981. These estimates have been updated for 1982 and are summarized in Table 3. Despite the significant decrease in the size of the infestation in northeastern Ontario, depletion in the fir (**Abies** spp.) and spruce (**Picea** spp.) stands continued at rates higher than the five year averages (1977-1981) reported in 1981. This is because the budworm is continuing to have an impact, in terms of reduced growth and mortality, in stands currently suffering moderate-to-severe defoliation as well as in stands that were previously infested but have been relatively free of budworm for the last year or so. In these stands, the rate of recovery, in terms of growth, and the cessation of budworm-caused tree mortality will be governed by the degree of damage each stand suffered while infested. Growth loss and tree mortality should continue to increase in northwestern Ontario where the infestation is expanding, whereas in northeastern and southern Ontario, populations appear to be collapsing and depletions due to budworm should show a corresponding decrease during the next few years.

Egg-mass counts and defoliation estimates were obtained at 623 locations during August and September in a province-wide survey. On an overall basis, egg-mass densities increased by some 12% although there were declines in three of the four regions sampled. Egg-mass numbers declined by about 17% in southern Ontario and, as a result, the total area of moderate-to-severe defoliation should decline further in 1983. Forecasts call for generally trace or light defoliation interspersed with numerous scattered pockets of moderate-to-severe defoliation and the total infestation in southern Ontario will likely be reduced to 200,000 ha or less. In northeastern Ontario, egg-mass populations changed only slightly, decreasing by 4%. Four districts showed increases whereas 10 districts had declines ranging from 7% to 89%. In the eastern part of the North Central Region, egg-mass densities decreased by 10% over all, although there were increases in eastern Terrace Bay, northern Wawa, southeastern Geraldton and southwestern Hearst districts. Another major area of defoliation totalling some 3.5 million ha should recur in the northeastern region from Sault Ste. Marie to North Bay. A number of small pockets of defoliation should occur elsewhere throughout the two regions. In northwestern Ontario, egg-mass densities increased by some 60% in

Table 3. Depletion of primary growing stock by spruce budworm in Ontario (000,000 m^3).

	Growth loss (CAI) in 1982	Tree mortality in 1982	Volume loss in 1982	Cumulative mortality to 1982
Balsam fir	1.447	11.252	12.699	61.096
White spruce	.205	1.768	1.973	9.813
Black spruce	.352	1.595	1.947	7.826
Total	2.004	14.615	16.619	78.735

1982. Large increases occurred in Atikokan District (136%) and Fort Frances District (80%) whereas a smaller increase of 22% occurred in Thunder Bay District. It is expected that the area of moderate-to-severe defoliation in northwestern Ontario will double in extent in 1983 to approximately 2.0 million ha.

Jack Pine Budworm (**Choristoneura pinus pinus** Free.)

The last jack pine budworm outbreak in Ontario occurred between 1966 and 1973 when heavy infestations damaged jack pine (**Pinus banksiana** Lamb.) stands in northwestern and central Ontario. There was considerable tree mortality in Kenora, Dryden, Sudbury, North Bay, Parry Sound, Pembroke and Algonquin Park districts. The Ontario Ministry of Natural Resources sprayed a total of 6,000 ha in 1968, 1969 and 1972 for the purpose of protecting high-value areas.

Since 1974, numbers of this insect have remained generally low throughout the province. However, in 1982 there were population increases in southern Ontario and about 1,000 ha of moderate-to-severe defoliation were mapped (Fig. 3). Aerial and ground surveys detected moderate-to-severe defoliation of jack pine in an area of approximately 308 ha in the Johnston Harbour and Sauble Beach areas of Owen Sound District. Approximately 80 ha of jack pine plantations were moderately to severely defoliated in Oro and Vespra townships, Huronia District, including parts of the Hendrie Forest. Three separate pockets of moderate-to-severe defoliation with a total area of 593 ha were mapped in Carling Township, Parry Sound District. An additional 39 ha were lightly defoliated in the same area. Egg surveys carried out during August, 1982 indicated that medium-to-heavy infestations will persist or expand in these areas in 1983.

Figure 3. Locations in Ontario (Owen Sound, Huronia and Parry Sound districts) where jack pine budworm defoliation was found in 1982.

Moderate-to-severe defoliation ..... ●

Light defoliation ..... ○

Swaine Jack Pine Sawfly (**Neodiprion swainei** Midd.)

In 1981, there was a dramatic increase in Swaine jack pine sawfly populations in the Elk Lake Management Unit, Temagami District, Northeastern Region. FIDS staff conducted several surveys during the summer of 1982 to monitor the situation. Plots were established to determine the level of impact this pest will have on the host trees. Sex attractant traps were used to obtain information about the distribution of adult male sawflies in the area. Information gathered during an egg cluster survey in late July was used to forecast potential tree defoliation. Finally, the level and extent of defoliation were determined during an aerial survey of the area in September.

Aerial surveys revealed that changes had occurred in 1982. The Lady Evelyn infestation had declined from 1,035 ha in 1981 to 700 ha in 1982 (Fig. 4). Accompanying the decrease in area was a general reduction in the intensity of the infestation, and defoliation was generally light and located in scattered pockets. The Banks-Makobe infestation decreased in size from 4,660 ha in 1981 to 3,950 ha in 1982 (Fig. 4). Some of the infested stands were salvaged by cutting operations in the southwest portion of the infestation in Wallis Township. However, there was some expansion of this infestation northward along the Makobe River to a point just north of Alexander Lake in Willet Township and westward along Crane Creek almost to Crane Lake in Roadhouse Township. As in the Lady Evelyn infestation, there was a general reduction in population levels in the Banks-Makobe infestation from 1981 and damage was generally moderate, though severe in pockets.

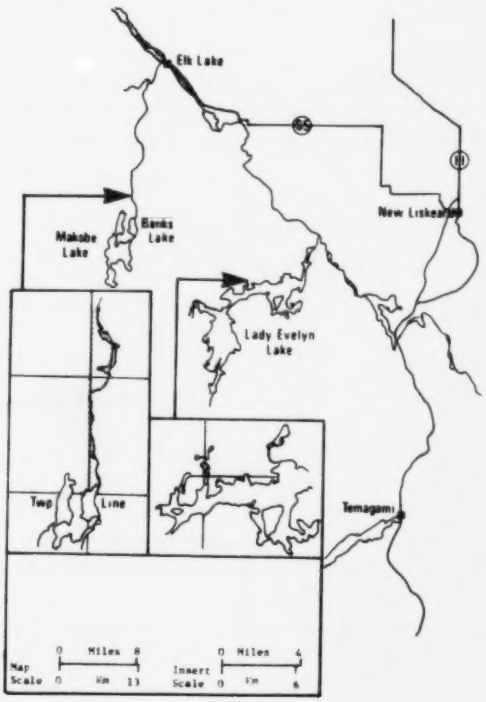


Figure 4. Swaine jack pine sawfly, Kirkland Lake and Temagami districts.

Area of infestation 1982...

Pockets of light-to-moderate defoliation and scattered sawfly colonies were observed in both jack pine stands and plantations in Gamble and McGiffin townships, along the Beauty Lake Road from Little Southbear Lake to the south branch of the Lady Evelyn River and on several islands in Lake Temagami. Little change occurred in the small infestation (20 ha) detected last year in James Township, Kirkland Lake District.

Although both infestations decreased slightly in area and intensity in 1982, the overall situation is much the same as it was in 1981. There is still an abundance of host type outside the infestations and the potential for expansion of the outbreaks in 1983 remains.

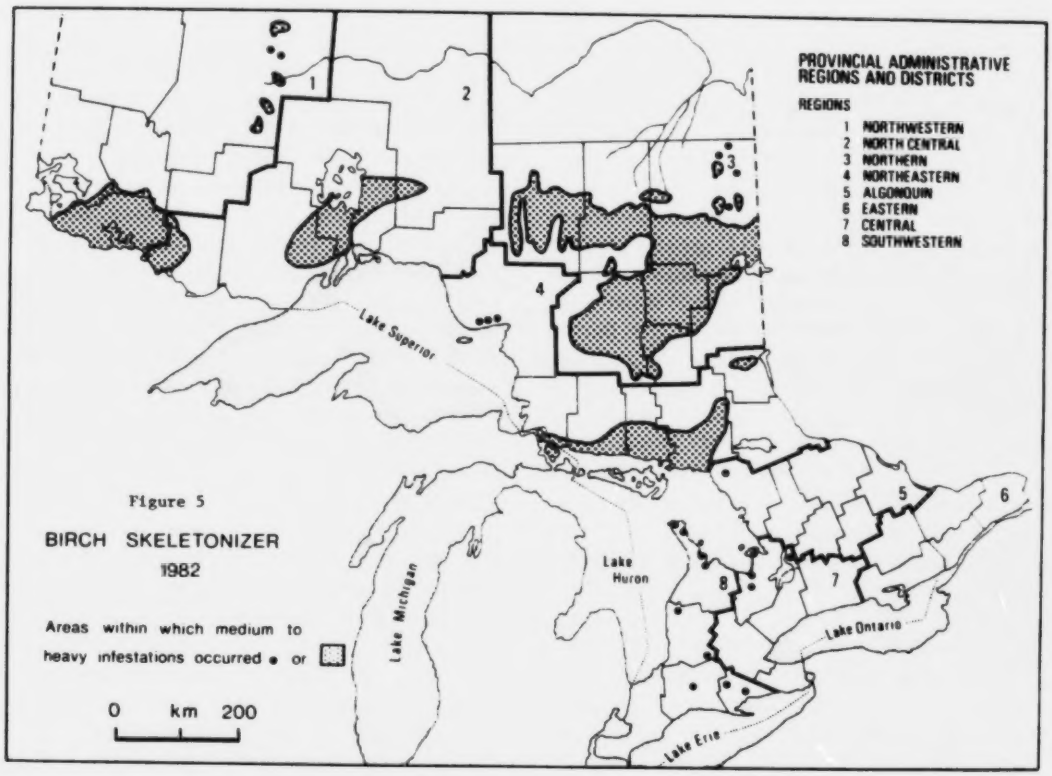
Deciduous

Birch Skeletonizer (**Bucculatrix canadensisella** Cham.)

The last outbreak of this pest in Ontario occurred between 1970 and 1973 when white birch (**Betula papyrifera** Marsh.) was severely defoliated over extensive areas of northern and northwestern Ontario. From that time until recently, populations remained very low; however, in 1981, a new outbreak became evident when moderate-to-severe defoliation was mapped over extensive areas of northeastern and northwestern Ontario. The

outbreak continued to expand this year with the total area of moderate-to-severe defoliation increasing from 56,700 km^2 in 1981 to 82,300 km^2 in 1982 (Fig. 5). This year moderate-to-severe defoliation of white birch totalled about 57,200 km^2 in the Northern and Northeastern regions, about 25,000 km^2 in the Northwestern and North Central regions and about 100 km^2 in small scattered pockets in southern Ontario.

throughout much of southern Ontario in recent years. Defoliation by this insect is considered a major predisposing factor in oak decline, dieback and mortality. In 1981, oak leaf shredder populations declined over all and most infestations subsided except for a few locations in the Central, Northeastern and Southwestern regions.



Oak Leaf Shredder (**Croesia semipurpurana** [Kft.])

The oak leaf shredder has been a persistent pest of red oak (**Quercus rubra** L.)

In the Central Region in 1982, the overall area suffering moderate-to-severe defoliation declined from 1,100 ha in 1981 to 700 ha. Populations increased slightly in oak stands in the main tract of the Durham Regional Forest, Maple District

where defoliation averaged 50%. In the Huronia District, medium-to-heavy infestations, with defoliation in the 50% range, were reported over most of the Dufferin County Forest and adjacent parts of the Simcoe County Forest. Medium infestations with defoliation in the 20-40% range occurred in scattered woodlots in the Cayuga-Fonthill-St. Catherines area of Niagara District. A total area of about 100 ha was affected. In the Southwestern Region, defoliation was recorded in the Simcoe and Chatham districts. In the Northeastern Region, populations remained unchanged at the medium level in the Sault Ste. Marie and Blind River districts whereas populations on Manitoulin Island, Espanola District declined to very low levels.

Egg surveys indicate that moderate-to-severe defoliation will persist in the Dufferin Forest area of Huronia District in 1983. Some moderate defoliation will recur in the Main Tract of the Durham Regional Forest in Maple District. Elsewhere, light defoliation is expected.

Since 1977, FIDS staff have maintained 13 plots to monitor the condition known as oak decline. Initially, 100 live trees were marked in each plot. In 1982, total mortality among the 1,300 trees was 9.2%, in comparison with 7% in 1981.

In 1981, the FIDS Unit began field trials to determine if pheromone traps could be used to predict oak leaf shredder populations and thus possibly replace the expensive egg-sampling method now employed. These trials were repeated in 1982 and results from both years indicate a relationship between the number of male moths captured and the number of eggs deposited.

Gypsy Moth (**Lymantria dispar** [L.])

Populations of this introduced insect, first detected in Ontario in 1969 near Kingston, remained low until 1981 when pockets of defoliation totalling about 2,000 ha were mapped in the Eastern Region. In 1982, larvae or defoliation caused by gypsy moth were reported from 34 locations in the Eastern Region (Fig. 6) and defoliation totalled about 4,800 ha. Six pockets of severe defoliation totalling 269 ha and 12 pockets of moderate defoliation totalling 3,341 ha were mapped in the Tweed District. New infestations causing moderate defoliation were mapped in a 130-ha area south of Fifth Depot Lake in Tweed District and in an area of about 1,000 ha in Frontenac Provincial Park in Napanee District. Other pockets of light-to-moderate defoliation were detected in the Pitts Ferry (2 ha) and Wolfe Island (scattered) areas near Kingston. A number of other pockets were detected as a result of ground surveys. These were small, ranging in size from single trees to about 10 ha and populations were also generally very low. The largest area involved approximately 10 ha of moderately defoliated trembling aspen (**Populus tremuloides** Michx.) in Lochiel Township, Cornwall District. Another 7 ha of aspen along Hwy 417 in Caledonia Township, Cornwall District were severely defoliated. There was also scattered moderate-to-severe defoliation in Belleville, Napanee District on the east side of the Moira River. Moderate defoliation was observed in a 5-ha mixed deciduous woodlot west of the town of Napanee in Richmond Township, Napanee District. The rest of the sightings generally involved only one or two trees and were located in South Plantagenet, Caledonia, Charlottenburgh, Osnabruck, Winchester and Cornwall townships as well as the city of Cornwall, all in the Cornwall District; Tyendinaga and Fredericksburgh townships in Napanee District; Marmora Township in Tweed District; and the city of Ottawa in Carleton District.

Since 1979, the FIDS Unit, in cooperation with Agriculture Canada, has deployed gypsy moth pheromone traps in 36 provincial parks and campgrounds through-

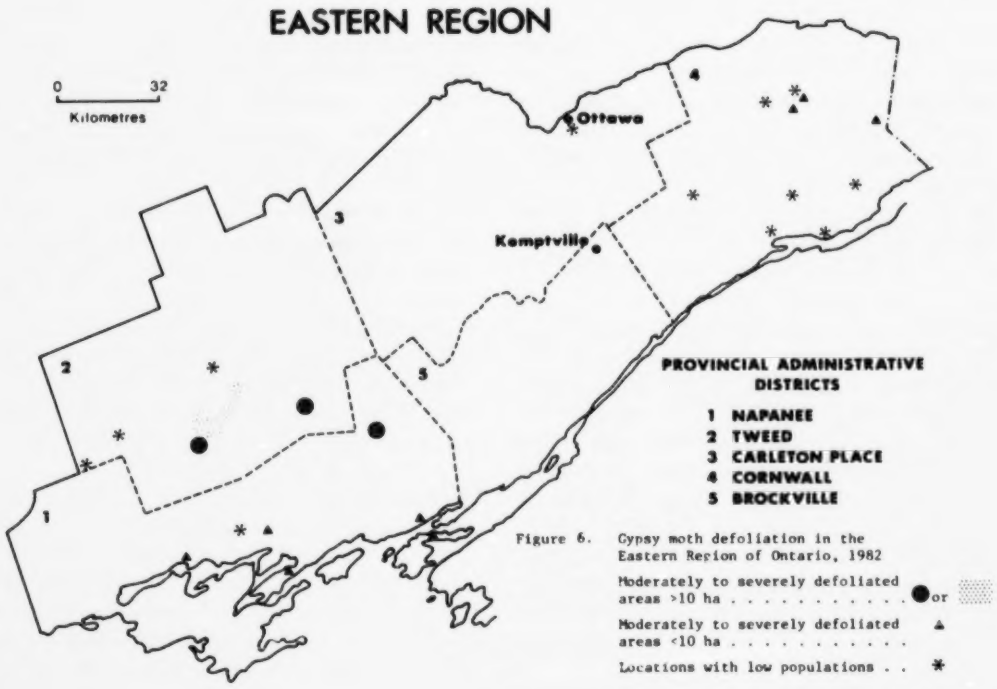


Figure 6. Gypsy moth defoliation in the Eastern Region of Ontario, 1982

out the Northern, North Central and Northeastern regions of the province. Pheromone traps were also placed in 13 oak decline plots in southern Ontario in 1982. A single adult male was trapped at White Lake Provincial Park in Wawa District, two moths were trapped in Alice Township and one at the Petawawa National Forestry Institute in Buchanan Township, Pembroke District, eight at Durham Regional Forest, Maple District and a total of 30 moths in two traps in Lavant Township, Carleton Place District. In all of these cases FIDS staff did not detect any other evidence of a resident population.

Larval surveys were conducted this past summer throughout southern Ontario outside of the generally infested area. Large larvae were trapped by tying strips of burlap to the trunks of the trees. A total of 39 plots, with 10 traps per plot, were set up in early June and checked several times during the next four weeks. Plots were located as far north as Sault Ste. Marie. Larvae or pupae were observed at six locations: in Barrie and Olden townships, Tweed District, in Bedford Township, Napanee District, in the cities of Kitchener and Oakville, Cambridge District, and in Niagara Falls, Niagara District. Egg masses and adult moths were observed in London but not on burlap traps.

Forest Tent Caterpillar (**Malacosoma disstria** Hbn.)

Infestations of this insect reached a peak of nearly 18 million ha in trembling aspen and poplar (**Populus** spp.) forest in Ontario in 1978 and have declined steadily since then. In 1982, approximately 103,700 ha of moderate-to-severe defoliation were mapped in comparison with 228,000 ha in 1981.

In the Thunder Bay District, the infestation around the city of Thunder Bay declined from 65,000 ha in 1981 to 35,200 ha in 1982. The infestation spread into parts of Paipoonge, Neebing, Scoble and Blake townships south of the city, but declined in the urban area and in areas to the west and northwest. Egg-band counts indicate that populations will probably remain high in 1983 with some spread to the north into Conmee, Oliver and McIntyre townships.

In Espanola District, moderate-to-severe defoliation persisted in about 6,233 ha of trembling aspen forest in parts of Shakespeare, Hallam, Merritt and May townships. Two separate infestations which occurred in 1981, one in Denison and Drury townships and the other in Jennings, Dunnett and Casimir townships, Sudbury District, collapsed in 1982. Egg-band counts indicate that the remaining infestations in Espanola District will collapse in 1983.

In Cochrane District, the infestation located north of the town of Cochrane remained virtually unchanged from last year with 32,456 ha being moderately to severely defoliated. Egg-band counts show that this infestation will continue at about the same intensity in 1983 with little change in area.

A new infestation, north of the town of Matheson on the Cochrane-Kirkland Lake district boundary, caused about 29,600 ha of moderate-to-severe defoliation. Egg-band counts indicate that populations within the infested area will remain high in 1983 and some expansion will occur around the periphery of the present infestation.

MAJOR FOREST DISEASES

Conifer

Scleroderris Canker (**Gremmeniella abietina** [Lagerb.] Morelet)

European race: Two races of the fungus **G. abietina** cause this disease. In the northeastern United States the European race of the fungus is a much more virulent pathogen than the North American race. Quarantine restrictions on the movement of host material and eradication efforts to prevent the spread of the fungus in instances where it has been found in Canada have been successful to date.

Surveys to detect Scleroderris canker were performed again this year, and it appears that Ontario remains free of the European race of the fungus. Fortunately, both races of the fungus are absent from a large part of southern Ontario including those areas where the European race is most likely to enter. Consequently, it has not been necessary to identify race immunologically for a large number of isolates of the fungus. Efforts by FIDS staff in 1982 included the following: aerial surveys of southern Ontario and ground checks of any suspicious damage, exhaustive searches in 70 large plantations that have been monitored for the presence of Scleroderris canker since 1978, and visual checks of all pine (**Pinus** spp.) stands encountered in the routine travel of survey technicians. Also, the FIDS unit cooperated with OMNR in an intensive survey conducted in the Cornwall District, an area adjacent to locations in Quebec and New York State where the disease has been found. This intensive survey was contracted to KBM Forestry Consultants by the Pest Control Section, OMNR. KBM crews examined 246 red pine (**Pinus resinosa** Ait.) plantations in the area south of Highway 43 and east of Highway 34. The FIDS Unit helped by training survey crews and processing the collection of suspect material.

North American race: The status and impact of the Scleroderris canker disease caused by the North American race of the fungus on jack pine and red pine remains essentially unchanged from that reported in the 1980 annual report. Conditions were favorable for infection in the Northeastern Region in 1981, and this year the number of trees affected and the mortality rate for red pine increased, especially in the Blind River District, where a red pine plantation was found with 85% of the trees affected. Two plots that were established in 1981 to investigate the intensification of the disease in red pine plantations showed mortality rates of 7% and 3% for 1982 and the percentage of trees affected rose from 24 to 32% in one plantation and remained static at 7% in the other.

Tip Blight (**Sphaeropsis sapinea** [Fr.] Dyko and Sutton [= **Diplodia pinea** (Desm.) Kickx.])

Sphaeropsis sapinea (Fr.) Dyko and Sutton has been collected in Ontario with increasing frequency since 1977. Damage from this fungus is widespread throughout the southern portion of the province, with ornamental, windbreak, and forest trees being infected. Seven host species have been recorded in Ontario, with 45% of the collections being made from Scots pine (**Pinus sylvestris** L.), 20% from Austrian pine (**P. nigra** Arnold), 19% from red pine, 6% from jack pine, 4% from white pine (**P. strobus** L.) and 3% each from Norway spruce (**Picea abies** [L.] Karst) and Douglas-fir (**Pseudotsuga menziesii** [Mirb.] Franco).

Infection usually takes place in the new shoots, often resulting in their death. Older stem tissue can also be infected. Stem cankers caused by an unidentified species of **Sphaeropsis** were noted on European larch (**Larix decidua** Mill.) in Oxford on Rideau Township, Brockville District and were responsible for the death of 9% of the trees in a very wet portion of a plantation. It is suspected that excessive soil moisture weakened the trees, predisposing them to infection by the fungus. Mortality was also recorded in two Scots pine plantations in the Cambridge District. The trees were over 10 m in height and infection levels were 94% and 88% with mortality at 19% and 9%. **Sphaeropsis sapinea** was identified as the causal agent in both Scots pine areas.

Most infections by **S. sapinea** do not result in mortality. Mortality is not common, but shoot damage can significantly reduce the value of ornamentals and trees in Christmas tree plantations. Severe infection can also reduce the protective value of windbreaks. The impact of infection by this fungus on tree growth (radial and height) has yet to be determined but it could be significant in areas where a large number of shoots are killed for several successive years.

Needle Droop

A number of red pine plantations in the Blind River and Espanola districts, Northeastern Region suffered extensive climatic damage in 1982. The condition, termed needle droop, affects trees under 2 m high and 2,000 to 3,000 ha of young red pine plantations were damaged. In many of these plantations, virtually all of the needles produced in 1982 showed the droop symptom. Damage is first evident as a patch of dead tissue at the needle base, and needles usually bend over at this spot. Only the needles produced in the current year are affected and eventually the entire affected needle dies and turns brown. Most of the trees in the affected plantations will suffer complete loss of current foliage. Some terminal shoot mortality is expected as some trees had damaged buds.

Needle droop is caused by excessive drying conditions often referred to as physiologic drought. High temperatures, bright sunlight, low humidity and breezy conditions create a greater demand for moisture than the rate at which water can be supplied from the soil. The rapid transpiration of water causes localized drought conditions in the immediate vicinity of the roots even when soils are somewhat moist. An abundance of moisture early in the growing season has been noted to be conducive to damage caused by physiologic drought, which usually occurs in late July or August when needles are more succulent than normal.

The needle droop symptom is also characteristic of damage caused by certain insects and diseases. European pine needle midge (**Contarinia baeri** [Prell]) and Scleroderris canker disease were detected in some of the plantations; however, the preponderance of damage observed appeared to be physiologic needle droop.

Deciduous

Dutch Elm Disease (**Ceratocystis ulmi** [Buism.] C. Moreau)

Dutch elm disease (DED) caused by the fungus **Ceratocystis ulmi** [Buism.] C. Moreau was first detected in Ontario in Prescott County, Cornwall District, Eastern Region in 1946. It seems to have spread into other parts of southern Ontario from the Cornwall District and

from the west from entries near Windsor and Welland, and by 1961, DED was present throughout southern Ontario. By 1967 diseased elms (**Ulmus** spp.) were being found along the north shore of Lake Huron. In 1976 the disease was found in northwestern Ontario, probably having spread from Minnesota. At present, DED affects all major concentrations of elm in Ontario, and only a few small isolated populations of elm remain disease free (Fig. 7).

The fungus is spread by two insect vectors, the smaller European elm bark beetle (**Scolytus multistriatus** [Marsh.]) (SEEBB) and the native elm bark beetle (**Hylurgopinus rufipes** [Eich.]) (NEBB). During the summer of 1982, elm trap logs, about 100 cm long and of varying diameter, were deployed to survey the occurrence and abundance of, principally, the NEBB, along with its counterpart, the SEEBB. The results of the trapping program indicate that the NEBB is present in Fort Frances District and at Old Fort William, Thunder Bay. There was no evidence of the European species in these areas. East of this area, no galleries of either species were detected throughout northern Ontario, although low populations of NEBB are likely present. Both species were found in trap logs throughout southern Ontario south of a line approximately joining Parry Sound and Pembroke.

Pheromone traps, specific for the introduced vector, were placed throughout the province in May and again from late June to early July. On the basis of these trap catches, the SEEBB was found only in the Southwestern and Central regions and in the Tweed District, Eastern Region.

In addition, a survey was conducted to rate the current status of DED in populations of urban, rural and juvenile elms throughout Ontario (Table 4). In northeastern and southern Ontario, DED has been

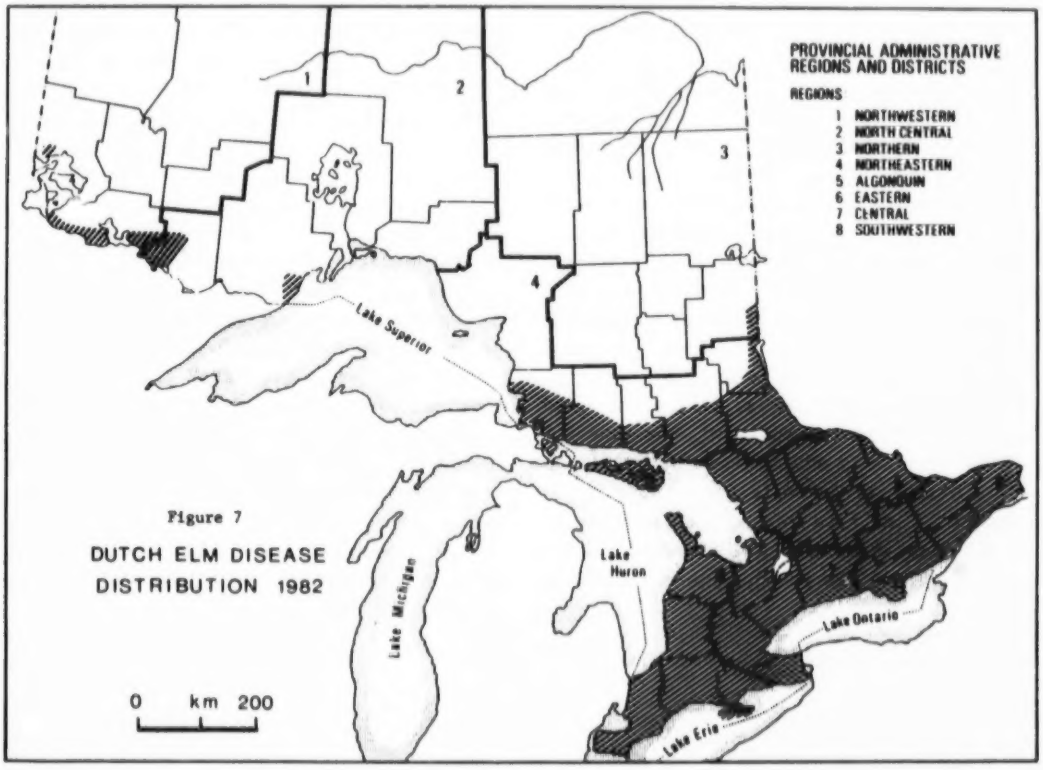


Figure 7
DUTCH ELM DISEASE
DISTRIBUTION 1982

present for many years, most elms are dead, and disease level in the residual elm population seems to have stabilized. In the northwest, the disease was first detected in the city of Thunder Bay in 1976 and was first reported in the towns of Rainy River and Kenora in 1980 and Atikokan in 1982.

In the southern and northeastern parts of Ontario, urban elms have been ravaged by DED for a number of years. The elms remaining in cities and towns in most cases constitute only a small proportion of the trees present before the arrival of the disease. A total of 92 towns or cities were sampled in the course of this survey. Elm could not be found in 39 towns, the majority of which, 29, were located in northern Ontario. The current incidence of DED is about 9% in urban locations (Table 4). Mature elm are common in about a third of the communities sampled and elm is still a major species in many communities. Mature elms ($\geq$10 cm in diam) were considered scarce if 50 trees could not be found in one hour of travel in a community.

The numbers of rural elms alive today are probably much lower now than they were before the spread of DED; however, many mature elms are still living. The sampling procedure in 1982 for rural elms required that 100 mature elms be observed within a distance of 20 km.

Living mature elms remain in woodlots and forest stands, but these are generally scarce since the stands are seriously depleted of elm as a result of past effects of the disease.

Stands of juvenile elm (diam <10 cm, height >2 m) have regenerated on many of the sites where elm was abundant in the 1950s. These are young, vigorous elm with an annual diameter increment often greater than 1.5 cm. It will be interesting to observe if these stands develop to commercial size.

The rates of infection in urban and rural (woodland) elm populations (Table 4) are considerably lower than those in the 1960s. At that time, levels exceeding 50% infection and 25% mortality were common. Disease levels estimated for 1982 are probably typical for recent years. Most of the elms are dead; consequently, the beetle vector populations, the amount of **C. ulmi** inoculum present and the resulting incidence of DED are comparably reduced.

The percentage of trees infected in 1982 was 14% for rural populations and 8.5% for urban trees (Table 4). Annual mortality averaged 2.0% and 1.5%, respectively. DED appears to be more intense in the Algonquin, Eastern and Northeastern regions than in the Central, Northern and Southwestern regions.

Urban centres such as Sault Ste. Marie which have had DED control programs for a number of years have very low levels (<1.0%) of disease. Many communities have significant populations of surviving elms and should consider starting control programs. The incidence of DED in juvenile stands was considerably lower (1.3%) than that for mature rural elm (14%) (Table 4).

In northwestern Ontario, elm is still common at most locations where there were significant populations of the species in the past, but this situation is changing rapidly as DED intensifies. For example, elms in typical hedgerow situations (such as were common in southern Ontario) exist in a narrow area of farmland north of Rainy River; however, DED is currently having a dramatic impact and the species

will likely be scarce throughout this area in the future. It is likely that elm will regenerate at most of the rural and woodland sites where DED is currently active.

The incidence of DED estimated for urban locations in northwestern Ontario (Table 4) does not truly reflect the impact of the disease as elm has never been common in some of the towns sampled and elm density in comparison with that in southern Ontario is low. Some of the towns sampled have disease control programs that require removal of dead and diseased elm. DED is not yet present in Dryden, and has only recently arrived in other locations. Disease levels for communities that are attempting to control DED are higher now than the levels to be expected after elms in adjacent areas are mostly dead. Also, disease levels will increase in places in which DED has arrived only recently. The rural sites sampled (Table 4) probably reflect the level of disease to be expected for an urban location after DED is present and is not controlled for a 5-year period. These sites had about 35% of the elms infected and a mortality rate of 3.2% in 1982.

Maple Decline

The urban maple (**Acer** spp.) problem referred to as maple decline in last year's report did not occur this year. In 1981, maples in a number of towns in the Eastern, Northeastern and Southwestern regions were affected in a way that caused extensive and rapid crown deterioration. This problem seemed to be distinct from other general maple problems that are often referred to as dieback or decline. Affected trees seemed to leaf out normally at the start of the growing season. Then leaves yellowed and dropped from the trees. Large sections of tree crowns subsequently died and in some instances entire trees were killed. Efforts to identify the causes of this maple condition were made early this season. However, most urban maples were relatively healthy in 1982, and maples suffering this rapid crown deterioration were not observed.

Maple Scorch

Late-spring leaf scorch affected red maple (**Acer rubrum** L.) and sugar maple (**A. saccharum** Marsh.) in many parts of the Algonquin and Northeastern regions and the northern portions of the Central and Southwestern regions. Foliar damage, often covering over 90% of the leaf surface of trees, was present in approximately 100,000 ha of maple forest. The damage occurred in patches of trees in a pattern which suggested that exposure to sunlight influenced the intensity of damage. In early stages of leaf growth, the ability to regulate transpiration is not fully developed. Maple is particularly poor in this respect; hence, maples often suffer scorch while other species are not damaged. Excessive drying conditions such as bright sunlight, low humidity, and breezy conditions often following relatively wet weather cause the desiccation and collapse of leaf tissue. Affected leaf portions die and turn brown. This year most of the affected trees did not produce much additional foliage and the trees were brown and defoliated throughout the growing season.

Table 4. Summary of trees affected by Dutch elm disease in populations of urban, rural and juvenile elms in Ontario, 1982.

Geographical region	Locations	Number of trees			Affected (%)
		Healthy	Diseased	Dead	
Urban					
Southern	41	1198	111	38	11.1
Northeastern	29	448	17	2	4.1
Northwestern	22	826	63	0	7.1
	92	2472	191	40	8.5
Rural					
Southern	32	3377	388	86	12.3
Northeastern	16	764	48	0	5.9
Northwestern	4	422	207	21	35.0
	52	4563	643	107	14.1
Juvenile					
Southern	26	2897	28	8	1.2
Northeastern	10	1012	15	0	1.5
	36	3909	43	8	1.3

SPECIAL SURVEYS

Red Pine Plantations

In 1982, a special survey of red pine plantations was conducted in southern Ontario to determine the prevalence of insect and disease pests and to update baseline information about pests affecting these stands. This report presents results of the 1982 survey and compares results with those of a previous survey of red pine in 1979. Thirty plantations were examined in each year.

The pine false webworm (**Acantholyda erythrocephala** [L.]) was the most commonly encountered insect. It was found in eight plantations in 1982 in comparison with seven in 1979. Generally, only trees under 6 m high are infested. About 6% of the total, or 258 trees, were infested in comparison with 7% in 1979. The greatest damage observed in the survey was in a Huronia District plantation where 73% of the trees were infested, and defoliation averaged 25%. As in 1979, the pine false webworm could not be found in the Southwestern Region.

The European pine sawfly (**Neodiprion sertifer** [Geoff.]) was the next most abundant insect: it was found in seven plantations in the Central and Southwestern regions. In 1979, it was found in eight plantations throughout the four southern regions. Populations were low and damage was negligible in the two surveys. This insect tends to infest trees under 6 m high.

The European pine shoot moth (**Rhyacionia buoliana** [Schiff.]) was found at very low levels in a total of five plantations (four in 1979) in all regions except the Eastern. This insect tends to attack trees under 6 m high. Pine root collar weevil (**Hylobius radicis** Buch.) and redheaded pine sawfly (**Neodiprion lecontei** [Fitch]) were not detected in 1982. Although the eastern pine shoot borer (**Eucosma gloriola** Heinr.) was found in eight plantations in 1979, it occurred in only three locations in 1982 at very low levels.

Generally, red pine has only a few potentially important disease pests. The North American race of Scleroderris canker, which was found in two plantations in 1979, was not encountered in the stands sampled in 1982. Armillaria root rot (**Armillaria mellea** [Vahl ex Fr.] Kumm.) was detected in two of the 30 plantations sampled where 1% and 2% of the trees, respectively, were affected. In 1979 it was found at low levels in one plantation. Foliar diseases caused by needle cast (**Lophodermium** sp.) and needle rust (**Coleosporium asterum** [Diet.] Syd.) occurred only at the trace (1-5%) and low (6-25%) levels of foliar damage. Needle rust was observed in 10 plantations, all under 6 m high. Needle cast was present in only two stands. This is essentially the same level of occurrence as was determined in the 1979 survey. Stand openings may reflect various problems such as root rot or adverse site reactions. Openings were observed in seven plantations; however, tree mortality associated with the opening was negligible or was caused by something such as rodent feeding.

Jack Pine Plantations

The counterpart to the red pine plantation survey in southern Ontario in 1982 was an examination of jack pine plantations throughout northern Ontario. This report presents results of the 1982

survey and compares results with those of a previous survey of jack pine in 1979. Fifty-four plantations were checked in 1982 in comparison with 55 in 1979.

The eastern pine shoot borer, the most common insect found, was detected in 21 plantations. This is similar to the situation in 1979 when the insect was found in 20 plantations. Total damage, however, was minor, with an average of 1.0% of leaders infested. The highest incidence of infested leaders was 9% in a plantation in Timmins District. In 1979, the level of damage in terms of leaders attacked was 2%. Trees under 6 m generally seem to be preferred by this insect.

White pine weevil (**Pissodes strobi** [Peck]) was found in 19 plantations and leader damage over all amounted to 0.7%. The highest incidence of weeviled leaders was 11% in a plantation in Gogama District. Most of the damage occurred on trees less than 6 m high. Again, this is very similar to the situation in 1979. Jack pine tip beetle (**Conophthorus banksianae** McPherson) was found in 15 plantations. Over all, the incidence of damaged leaders was 0.6% with the highest level of damage, 11%, recorded in a plantation in Thunder Bay District. This insect prefers trees under 2 m high although trees between 2 and 6 m are attacked. In 1979, 0.2% of the trees sampled had leaders attacked by this insect. The northern pitch twig moth (**Petrova albicapitana** [Busck.]) was found in 12 plantations but populations were generally low and damage was not significant. Other insects found were jack pine sawfly (**Neodiprion pratti banksianae** Roh.) in five plantations and jack pine budworm in two plantations. Populations were low and damage was negligible.

Diseases were fairly common in the sampled stands but in most instances there was little damage. Scleroderris canker was present in five of the stands sampled. Only two of the plantations which were on poor sites had significant damage. Trees less than 2 m high are generally infected by this disease. Globose gall rust (**Endocronartium harknessii** [J.P. Moore] Y. Hirat.) was found in 27 of the plantations including every plantation sampled in the Northwestern Region. The results of this survey are very similar to those of the 1979 survey.

Stem rusts (**Cronartium** sp.) were found in 11 plantations in 1982 in comparison with 14 in 1979. Over all, the number of trees affected was low and trees of all sizes were affected. Armillaria root rot was detected in 11 plantations in comparison with 15 in 1979. One plantation in Thunder Bay District had 2% of the trees affected whereas infection levels were 1% or less in the other plantations. Needle rust was found in 15 plantations and the trees affected exceeded 50% in four cases. The percentage of foliage affected, however, was always less than 3%; hence, foliar damage was negligible. Needle cast (**Davisomycella ampla** [Davis] Darker) was found in 17 plantations in comparison with 14 in 1979. Foliar damage was low.

Seed and Cone Pests of Red Pine

In a continuing program to assess seed production and the pest problems associated with it, a special survey of red pine cones was made by the FIDS Unit in 1982 to determine the extent and causes of damage. Collections were made of approximately 100 second-year cones still in

the green stage from five seed production areas in the Southwestern, Central, Eastern and Algonquin regions. The insects or diseases responsible for the damage were then identified.

Damaged cones ranged from 6% to 99% and seed loss within damaged cones ranged from 54% to 82% (Table 5). The principal causes of the losses are the red pine cone borer (**Eucosma monitorana** Heinr.), webbing coneworm (**Dioryctria disclusa** Heinr.) and red pine cone beetle (**Conophthorus resinosae** Hopk.). Other insects found in low numbers were **Dioryctria resinosella** n. sp. Mutuura (**D. zimmermani** Heinr.), the spruce coneworm (**D. reniculelloides** Mut. & Mun.), the fir coneworm (**D. abietivorella** [Grt.]) and an undetermined species of **Dioryctria**. External feeding damage by the larva of an unknown lepidoptera and a cone midge (**Asynapta** sp.) was also found.

The overall impact of insect infestation resulted in seed production reductions of up to 80%. Although eight species of insects were encountered, **D. disclusa** and **C. resinosae** were the principal causes of seed losses. It is evident that these insects have a significant adverse effect on red pine seed and cone production in southern Ontario. There were no losses attributable to diseases.

Table 5. Insect-caused cone damage and seed loss in red pine in southern Ontario, 1982.

Location	No. of cones examined	Cones damaged (%)	Seed loss within damaged cones (%)	Principal cause of seed loss
St. Williams, Southwestern Region	100	34	76	1. **Dioryctria disclusa** 2. **Eucosma monitorana**
Lynn Tract, Central Region	100	89	68	1. **Conophthorus resinosae** 2. **E. monitorana** 3. **D. disclusa** 4. **D. resinosella** n. sp. (**D. zimmermani** [in part])
Baltimore, Central Region	73	99	82	1. **C. resinosae** 2. **E. monitorana** 3. **D. disclusa**
Oxford Mills, Eastern Region	100	38	54	1. **E. monitorana** 2. **D. disclusa** 3. **Asynapta** sp.
Stonecliffe, Algonquin Region	104	6	60	1. **C. resinosae** 2. **E. monitorana**

Seed and Cone Pests of Jack Pine

The counterpart to the cone pest survey of red pine was a special survey in northern Ontario in 1982 to assess losses and causes of damage to jack pine cones. Each of the nine FIDS rangers in northern Ontario made a collection of about 100 cones. Green succulent cones close to full size in the second year of development were obtained. Where possible, the collections came from seed production areas or tree seed orchards.

The proportion of damaged cones averaged 26% for the nine locations, and ranged from 6 to 41%. Seed losses within damaged cones ranged from 9 to 90%. Over all, seed losses were approximately 6%. For various reasons many of the causes of cone damage could not be identified; however, the webbing coneworm (**D. disclusa**) and other undetermined species of lepidoptera were the major causes of seed losses. Generally, there do not seem to be any serious pest problems inhibiting jack pine seed production in northern Ontario.

Pine Wood Nematode (**Bursaphelenchus xylophilus** [Steiner & Buhrer] Nickle)

The pine wood nematode has been the subject of special surveys since 1980. In 1982, 34 collections of wood cores were received for examination. As in the two previous years, all samples proved to be negative for this tree pest. The survey for this pest will be continued in 1983, with emphasis being placed on exotic or native species of pine, particularly jack pine, that are dying or appear low in vigor and exhibit wilt symptoms.

CONTROL PROGRAMS

Spruce Budworm

In 1982, OMNR aerially sprayed 1,612 ha of high-value forests and 1,842 ha of commercial forests in the northern Ontario districts of Hearst, Kapuskasing and Temagami. Fixed-wing aircraft were used except where otherwise noted.

In 1981, an attempt was made to protect female flowers in seed production areas (SPA) from budworm feeding with an early or pre-emergence application of insecticide. A similar program was planned in 1982 to protect four white spruce SPAs, two in Temagami District and two in Hearst District. The first application of insecticide was scheduled to be made at the first sign of budworm emergence but several unforeseen problems delayed the spray by three weeks in both districts. In Temagami District, the two SPAs, Friday Lake and Matabitchuan, were treated with a double dose of Orthene (560 g/9.4 L/ha) applied by helicopter. The two SPAs in Hearst District (Arnott and Hanlan) were treated with a single application of Orthene (560 g/9.4 L/ha) followed by an application of Matacil (90 g/9.4 L/ha) about one week later. Results in these four SPAs were excellent, in terms of both larval mortality and foliage protection.

The chemical insecticide Matacil was also used to treat two other areas in Hearst District: a white spruce plantation in Rogers Township (90 g/3.0 L/ha) and a balsam fir moose yard in Chelsea Township (90 g/4.7 L/ha). Larval mortality due to treatment was very high in the Chelsea Township moose yard but, because the insecticide was not applied until the larvae were in the fifth and sixth instars, foliage protection was not satisfactory. Results were very good in the Rogers Township plantation, which was also treated with Matacil in 1981.

In 1982, 90% of the budworm spraying program involved the use of various formulations of the biological insecticide **Bacillus thuringiensis (B.t.).** Novabac 3-e was applied by helicopter in two SPAs in Kapuskasing District (Owens and Fauquier) and in a 172-ha portion of one of the commercial forest spray blocks in McEwing Township, Hearst District. Generally the results of this treatment were very good, especially on balsam fir. Another **B.t.** product, Thuricide 48B (30 BIU/2.4 L/ha), was tested on a stand of white spruce in Frost Township, Hearst District. Although population reduction was poor because of the lateness of the spray, some foliage protection was provided.

The main material used in the 1982 aerial spraying program in Ontario was another **B.t.** product, Dipel 88, which was applied to almost 80% of the forests treated. It was used extensively in Hearst District in two provincial parks, Nagagamsis and Fushimi, and three blocks of commercial forest in McEwing Township. All areas were treated at a dosage rate of 20 BIU/ha except for 305 ha that received 13 BIU/5.9 L/ha. Generally, results were very good in the commercial blocks, but because the parks were sprayed later, results in these areas, though still quite acceptable, were not as good.

Gypsy Moth

In 1982, OMNR, in cooperation with the Canadian Forestry Service (CFS), aerially treated 416 ha near Kaladar, Tweed District, with both biological and chemical insecticides. The original goal of population suppression, which involved the treatment of nearly 2,000 ha, was abandoned after controversy erupted over

the proposed use of carbaryl (Sevin-4-oil) on 1,600 ha of crown and private land. Instead, a series of trials previously planned by the CFS which involved B.t. and the NP virus, Gypchek, were carried out. In addition, a small block of crown land was sprayed with Sevin by OMNR. Sevin-4-oil was applied to 90 ha (1.1 kg/2.4 L/ha), Dipel 88 to 263 ha at two dosage rates (20 BIU/5.9 L/ha and 30 BIU/8.8 L/ha) and Gypchek to 63 ha (2.5×10^{11} PIB*/18.8 L/ha). The Gypchek trials were conducted with the cooperation of Dr. J.C. Cunningham of the Forest Pest Management Institute who in turn received the cooperation of the United States Forest Service in Hamden, Connecticut, which provided the Gypchek.

In late July a defoliation survey was conducted in treated and untreated plots in the Kaladar infestation. Generally, defoliation was much lighter in the treated areas than in the untreated check plots. Excellent foliage protection was afforded the areas treated with Sevin and, in view of their mode of action, very good results were achieved in the areas treated with Dipel and Gypchek.

Egg-mass surveys are frequently used as a means of evaluating the effectiveness of gypsy moth control programs and of forecasting potential defoliation the following year. A comparison of 1981 and 1982 egg-mass densities showed a 90%-95% decrease in egg-mass densities in the treated plots whereas a 324% increase was observed in the untreated plots.

In summary, the aerial spraying trials conducted in 1982 against gypsy moth in the Kaladar area were very effective in terms of population reduction, foliage protection and egg-mass reduction. Sevin appeared to be a most effective insecticide but was followed closely by B.t., especially at 30 BIU, and Gypchek.

*PIB = Polyhedral inclusion bodies.

OTHER NOTEWORTHY INSECTS AND DISEASES

Forest pests of less importance in 1982 are included in the following tables to provide information on the history and fluctuation in populations of these pests.

Forest insect pests and diseases are listed alphabetically by common name. Each organism listed is rated according to its importance as follows:

A - of major importance, capable of killing or severely damaging trees or shrubs;

B - of moderate importance, capable of sporadic or localized injury to trees or shrubs;

C - of minor importance, not known to present a threat to living trees or shrubs.

OTHER NOTEWORTHY INSECTS AND DISEASES

Insect or Disease	Host(s)	Locality	Remarks	Rating
Alder flea beetle **Altica ambiens alni** Harr.	alder (**Alnus** spp.)	Atikokan and Thunder Bay across the north to Temagami	high numbers and conspicuous defoliation throughout the north	C
Ambermarked birch leafminer **Profenusa thomsoni** (Konow)	white birch	northern Ontario	The 1981 infestation has collapsed, with low numbers prevailing throughout.	B
American aspen beetle **Goniocteng americana** (Schaef.)	trembling aspen	Barbara Lake Seed Production Area, Terrace Bay District	light defoliation in a 5-ha pole-size stand	B
Annosus root rot **Heterobasidion annosum** (Fr.) Bref.	pine	Cambridge and Simcoe districts	common in thinned plantations throughout the area	A
Anthracnose **Apiognomonia quercina** (Kleb.) Hoehn.	oak	Central, Eastern, and South-western regions	moderate damage associated with ornamental trees in urban areas	B
Apiognomonia veneta (Sacc. & Speg.) Hoehn.	sycamore (**Platanus occidentalis** L.)	Niagara and Simcoe districts	common on ornamental trees, causing defoliation and shoot dieback	B
Kabatiella apocrypta (Ell. & Ev.) Arx	maple	Central Region	widespread in the region but damage less than in 1981	B
Armillaria root rot **Armillaria mellea** (Vahl ex Fr.) Kumm.	pine	province-wide	associated with mortality of pole-size trees in Uxbridge Twp, Maple District, and 1-2% mortality in a number of young plantations throughout the province	A
Aspen leafblotch miner **Phyllonorycter ontario** (Free.)	trembling aspen	across northern Ontario and south to the Algonquin District	a 20% increase in area of severe mining and premature leaf discoloration to 120,000 km^2 in northwestern Ontario; populations up, with frequent cases of larger trees being attacked	B
Aspen leafroller **Pseudexentera oregonana** Wlshm.	trembling aspen	Northeastern Region	population collapse; no records in 1982	A

cont'd.

OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd.)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Balsam fir sawfly **Neodiprion abietis complex**	balsam fir	Maple, Owen Sound, Pembroke and Geraldton districts	scattered cases of low-to-moderate damage, except in King Twp, Maple District, where 7 ha were moderately damaged with up to 60% defoliation	A
Balsam poplar leaf beetle **Chrysomela walshi** Brown	balsam poplar **(Populus balsamifera** L.)	Temagami, Huronia, Kirkland Lake, Kapuskasing and Timmins districts	light-to-moderate defoliation	C
Balsam poplar leafblotch miner **Phyllonorycter nipigon** (Free.)	balsam poplar	west of Lake Nipigon, Red Lake, Sioux Lookout and Ignace districts	generally low numbers in northwestern Ontario	B
Beech scale **Cryptococcus fagisuga** Lindinger	beech **(Fagus** spp.)	E. Gwillimbury Twp, Maple District	trace occurrence	B
Birch leafminer **Fenusa pusilla** (Lep.)	white birch	northwestern Ontario	generally low numbers	A
		northeastern and southern Ontario	moderate-to-severe defoliation	
Birch sawfly **Arge pectoralis** (Leach)	white birch	Parry Sound, Carleton Place and Owen Sound districts	moderate-to-severe defoliation at several locations	B
Bronze birch borer **Agrilus anxius** Cory	white birch	Red Lake District	serious damage, with heavy tree and branch mortality for third year	B
Brown spot needle blight **Scirrhia acicola** (Dearn.) Siggers	pine	Huronia and Owen Sound districts	no change in status from 1981	A
Cedar leafminers **Argyresthia aureoargentella** Brower, with **A. canadensis** Free., **A. thuiella** (Pack.) and **Pulicalvaria thujaella** (Kft.)	eastern white cedar **(Thuja occidentalis** L.)	southern Ontario	Populations declined, with only pockets of moderate-to-heavy infestation. Some tip and tree mortality continued where past infestations have been severe.	A

cont'd.

OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd.)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Cherry casebearer (formerly aspen casebearer) **Coleophora pruniella** Clem. (formerly C. **innotabilis** Braun)	balsam poplar, white birch		This insect was not detected in 1982.	C
Cherry scallopshell moth **Hydria prunivorata** Ferg.	black cherry (**Prunus serotina** Ehrh.)	Uxbridge Twp, Maple District	heavy infestations with severe browning of foliage and defoliation	B
	pin cherry (**Prunus pensylvanica** L.f.)	Owen Sound and Simcoe districts		
Cone rust **Chrysomyxa pirolata** Wint.	spruce	Nipigon District	low level of infection noted in one area	B
Cytospora canker **Leucostoma kunzei** (Fr.) Munk ex Kern	spruce	province-wide	common cause of damage to ornamental spruce and noted on white spruce in Rideau River Provincial Park	B
Eastern blackheaded budworm **Acleris variana** (Fern.)	white spruce	Northwestern, Northeastern and Central regions	light and declining populations	B
		Woodstock and Palmerston, Southwestern Region	common on roadside and plantation trees	
Eastern pine shoot borer **Eucosma gloriola** Heinr.	jack pine red pine white pine Scots pine	province-wide	stable or declining populations; up to 17% damaged leaders in jack pine in the Northwestern Region and conspicuous damage to red pine seedlings at CFB Borden, Huronia District	B
Eastern tent caterpillar **Malacosoma americanum** F.	eastern chokecherry (**Prunus virginiana** L.) deciduous	southern Ontario	common	B
Eastern spruce gall adelgid **Adelges abietis** (L.)	white spruce		not recorded in 1982	B

cont'd.

OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd.)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Elm casebearer **Coleophora limosipennella** Dup.	white elm (**Ulmus americana** L.)	Kleinburg, Maple District Vineland, Niagara Falls District	low numbers	C
Elm leafminer **Fenusa ulmi** Sund.	white elm		not recorded in 1982	B
Elm leafblotch miner **Cameraria ulmella** (Chamb.)	white elm	Barrie, Huronia District Ancaster and Paris, Cambridge District	heavy populations on ornamentals and regeneration	C
European fruit lecanium **Lecanium corni** Bouché	red oak bur oak (**Quercus macrocarpa** Michx)	Shawanaga Island, Georgian Bay, Parry Sound District	moderate-to-high populations	B
European pine needle midge **Contarinia baeri** (Prell)	red pine	North Bay and Espanola districts	heavy damage in Nairn Township, Espanola District, where 87% of the trees had 90% of the current year's foliage affected	B
European pine sawfly **Neodiprion sertifer** (Geoff.)	Scots pine Mugho pine (**Pinus mugho** Turra var. **mughus** Zenari)	Eastern and Central regions	mostly low populations	A
	red pine	Southwestern Region	colonies more common in 1982 than in 1981	
European pine shoot moth **Rhyacionia buoliana** (Schiff.)	red pine	Aylmer, Wingham, Owen Sound and Cambridge districts	several scattered areas of heavy infestation in which trees are distorted; populations stable	A
Fall cankerworm **Alsophila pometaria** (Harr.)	various hardwoods	Fort Frances, Dryden and Kenora districts	heavy defoliation within towns	A
		Maple and Cambridge districts	general increase	
		Niagara District	declining numbers	

cont'd.

OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd.)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Fall webworm **Hyphantria cunea** (Dru.)	hardwoods	Pelpoonge and Neebing twps, Thunder Bay District; Broderick Twp, Kenora District; McGregsan and Watten twps, and Weller Lake, Fort Frances District	light populations and scattered colonies	B
		Northeastern, Central and Algonquin regions	generally low-to-moderate defoliation	
		Kirkland Lake District	increased population levels	
		Eastern and Southwestern regions	moderate-to-heavy infestations throughout, with many cases of severe defoliation	
Globose gall rust	pine	province-wide	common over much of the province; surveys in the Northwestern Region revealed incidence of 3.2-28.0%	A
Greenstriped mapleworm **Dryocampa rubicunda rubicunda** (F.)	red maple sugar maple	Fort Frances, North Channel, Lake Huron area, Driftwood Prov. Park and east of Mattawa, North Bay District	low numbers throughout	A
Hickory tussock moth **Halysidota caryae** (Harr.)	deciduous	west and east of Kingston	low populations easily detected	C
Ink spot **Ciborinia whetzelii** (Seaver) Seaver	aspen	province-wide	generally low levels of infection; surveys in the Northern Region showed 10% of trees infected, with foliar damage from 5 to 20%	B
Introduced pine sawfly **Diprion similis** (Htg.)	red pine white pine	Eastern and Central regions	populations low and stable	C
		Wingham District	an increase in 5 ha of white pine with severe defoliation	

cont'd.

OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd.)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Introduced pine sawfly (cont'd.)		Fort Frances and Kenora districts	high population reported by OMNR defoliating mature white pine on east side of Lake of the Woods, Kenora District; low populations elsewhere	
Jack pine sawflies **Neodiprion pratti banksianae** Roh.	jack pine	North Central, Northern and Southwestern regions	small, scattered colonies	A
Neodiprion pratti paradoxicus Ross	jack pine	Elizabethtown Twp, Brockville District	12-ha plantation with up to 100% loss of old foliage	A
		Minden Twp, Minden District	heavy defoliation	
		Chaffey Twp, Bracebridge District and Lindsay Twp, Owen Sound District	small, scattered colonies	
Jack pine tip beetle **Conophthorus banksianae** McPh.	jack pine	Temagami and Cochrane districts	moderate shoot mortality in plantations	C
		Maple District	moderate tip damage	
		Northwestern Region	low populations, light damage	
Juniper tip blight **Kabatina juniperi**	juniper **Juniperus** spp.	Huronia and Maple districts	found on ornamental juniper at one location in each district; first collections by FIDS	B
Larch casebearer **Coleophora laricella** (Hbn.)	tamarack (**Larix laricina** [Du Roi] K. Koch)	Hearst, Kapuskasing and Cochrane districts, Tehkummah Twp, Espanola District, Hugel Twp, North Bay District, London	Populations continue to decline to low numbers. A significant decline was noted in London.	B
		Sioux Lookout District	This represents a new range extension; numbers were low.	

cont'd.

OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd.)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Larch casebearer (cont'd.)	tamarack	Central Region	generally low populations except at Minesing Swamp, Huronia District	
	European larch		light damage only on this host	
Larch sawfly **Pristiphora erichsonii** (Htg.)	tamarack	province-wide	generally a decline to moderate or very low levels of infestation	A
		Morley Twp, Fort Frances District	10 ha with severe defoliation	
		Thunder Bay District, various locations, and Geraldton District	moderate-to-severe defoliation; up to 100% at Errington Twp, Geraldton; 80% parasitism of late-instar larvae in Colter Twp, Geraldton District	
	European larch	Huronia District, CFB Borden	15 ha of moderately to severely defoliated trees	
Large aspen tortrix **Choristoneura conflictana**	trembling aspen	Jennings, Casimir and Dunnet twps, Sudbury District	severe defoliation with light damage and low numbers elsewhere throughout Sudbury and North Bay districts	B
		Central Region	populations declining	
Leaf blotch **Guignardia aesculi** (Pk.) V.B. Stewart	horse-chestnut (**Aesculus hippocastanum** L.)	Niagara and Wingham districts	Severe damage was noted in the town of Goderich, with up to 80% defoliation on some trees, but in most of the area the level of infection was less than in 1981.	B
Leaf spot **Gnomonia leptostyla**	butternut (**Juglans cinerea** L.)	Eastern and Southwestern regions	Severe defoliation, 80-90%, was noted in numerous locations by mid-August in the Eastern Region and near Meaford in the Southwestern Region.	B
Marssonina brunnea (Ell. & Ev.) Magn.	trembling aspen hybrid poplar	Brockville and Fort Frances districts	light damage with leaf browning and premature defoliation	B

cont'd.

OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd.)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Leaf spot (cont'd.)				
Mycosphaerella effigurata (Schw.) House	ash (*Fraxinus* spp.)	Huronia District	browning and premature leaf drop at numerous locations in the northern part of the district	B
Mycosphaerella populicola C.E. Thomps.	balsam poplar	Central, Eastern and Southwestern regions	defoliation usually less than 75%, which is somewhat down from 1981 levels of defoliation	B
Linden looper **Erannis tiliaria** (Harr.)	basswood (*Tilia americana* L.)	Maple, Niagara and Huronia districts	common at low levels	B
Locust leaftier **Ylaecala reductella** Wlk.	black-locust (*Robinia pseudoacacia* L.)	Uxbridge Twp, Maple District District	Heavy defoliation recurred on hedgerow trees.	C
Maple leafcutter **Paraclemensia acerifoliella** (Fitch)	sugar maple	Eastern Region	The 1300 km^2 of severe defoliation in 1981 dropped to scattered pockets, up to 1 ha, but populations spread within the Region.	B
		Central Region, Robertson Tract of Halton Regional Forest	heavy damage for third year; 16 ha of semimature trees averaged 60% defoliation	
		Beausoleil Island, Georgian Bay Islands National Park	moderate damage to understory regeneration; elsewhere, the insect was absent or at very low levels	
Maple leafroller **Cenopis acerivorana** MacK.	red maple sugar maple	Sault Ste. Marie District	high populations persist in the northeastern part of the city	C
Maple petiole borer **Caulocampus acericaulis** MacG.	sugar maple	Tweed, Carleton Place and Cambridge districts	light-to-moderate damage to urban trees	C
Maple trumpet skeletonizer **Epinotia aceriella** (Clem.)	sugar maple	Pearce Provincial Park, Aylmer District	high populations recurred, with defoliation again up to 60%	C

cont'd.

OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd.)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Maple trumpet skeletonizer (cont'd.)		Sauble Beach, Owen Sound District	60 ha with up to 75% defoliation	
		Cambridge, Huronia, Espanola and Sault Ste. Marie districts	low-to-moderate numbers	
Maple webworm **Tetralopha asperatella** (Clem.)	sugar maple	Woolwich Twp, Cambridge District	Populations remain at moderate numbers.	C
		St. Williams, Port Rowan and Turkey Point areas, Simcoe District	common at low levels on small trees	
Mountain-ash sawfly **Pristiphora geniculata** (Htg.)	mountain-ash (**Sorbus** L.)	Fort Frances, Dryden, Ignace and Kenora districts, Northwestern Region	a further extension of 160 km to the northwest	A
		northern Ontario	High populations continue to cause severe defoliation.	
		southern Ontario	light-to-moderate defoliation	
Needle cast **Davisomycella ampla** (Davis) Darker	jack pine	Eastern, North Central, Northeastern and Northern regions	One plantation in Gladstone Twp had 22% foliar damage on 95% of the trees, but in most areas infection levels were lower than in 1981.	A
Lophodermium sp.	pine	province-wide	common at low levels in many areas; particularly severe infection in Boulter Twp, where an incidence of 75% and 65% foliar damage was recorded	A
Rhizosphaera kalkhoffii Bub.	spruce	Central and North Central regions	damage to ornamentals in urban areas and several locations of heavy infection in the Thunder Bay and Atikokan districts	B

cont'd.

OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd.)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Northern pine weevil **Pissodes approximatus** Hopk.	red pine Scots pine jack pine	McMurrich Twp, Parry Sound District, Vespra Twp, Huronia District and Calvert and Frost twps in the Cochrane and Hearst districts	Extensive seedling mortality and 25% of 1-m-tall red pine trees in a 5 ha plantation in McMurrich Twp killed	B
Northern pitch twig moth **Petrova albicapitana** (Busck.)	jack pine	Northwestern and Northern regions	populations declining throughout northwestern Ontario	C
Oak olethreutid leafroller **Pseudexentera cressoniana** Clem.	oak	Huronia, Maple and Niagara districts	increased levels of population	C
Orangestriped oakworm **Anisota senatoria** (J.E. Smith)	white oak (**Quercus alba** L.)	Southwestern Region	Populations continue to decline.	A
Pale spruce gall adelgid **Adelges strobilobius** (Kalt.)	white spruce black spruce balsam fir	Geraldton, Nipigon and Chapleau districts	low-to-moderate populations	C
Pine engraver **Ips pini** (Say)	red pine jack pine	Vespra Twp, Huronia District	associated with seedling mortality on experimental trees	B
		Bliss Twp, Chapleau District	moderate populations on fringe trees in large cutover area	
Pine false webworm **Acantholyda erythrocephala** (L.)	red pine Scots pine jack pine eastern white pine	Southwestern, Algonquin and Eastern regions	Populations continue to decline to very low levels.	A
		Huronia, Lindsay and Maple districts	pockets of heavy-to-severe defoliation causing noticeable growth reduction	
Pine needle rust **Coleosporium asterum** (Diet.) Syd.	pine	Eastern, Northern and Northwestern regions	generally low levels of infection but high levels noted in plantations between Hearst and Hornepayne	A

cont'd.

OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd.)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Pine needle rust (cont'd.)		Southwestern Region	common in red pine plantations near Norwich and St. Thomas	
Pine spittlebug **Aphrophora cribrata** (Wlk.)	Scots pine jack pine eastern white pine	Central and Northwestern regions	pockets of high population in North Channel area and Beverly Twp, Cambridge District	B
	European larch	Southwestern Region	The heaviest damage in the Region was to larch at St. Williams Nursery.	
Pine tortoise scale **Toumeyella parvicornis** (Ckll.)	jack pine	Crystal River, Ignace District, Cochrane and Kapuskasing districts	only low numbers detected	B
Plum pocket **Taphrina communis**	plum (**Prunus** L.)	town of Fort Frances	high incidence of infection and severe damage on trees raised for fruit production	B
Poplar flea beetle **Altica populi** Brown	balsam poplar	Manitoulin Island, Huronia and Owen Sound districts	pockets of moderate-to-heavy damage	C
Red band needle blight **Scirrhia pini** Funk & A.K. Parker	Austrian pine	Huronia and Owen Sound districts	common on host within these districts	B
Redheaded jack pine sawfly **Neodiprion virginianus**	jack pine	northern Ontario	declining populations in the Northern Region; populations low throughout area	A
Redheaded pine sawfly **Neodiprion lecontei** (Fitch)	red pine jack pine	southern Ontario	generally low populations with pockets of severe defoliation	A
		Bracebridge, Huronia, Minden and Tweed districts	high populations	
		Blind River, North Bay and Sudbury districts	pockets of severe defoliation, 25% to 100% of some trees	

cont'd.

OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd.)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Redhumped oakworm **Symmerista canicosta** Francl.	bur oak red oak white oak basswood	Islands in Georgian Bay, Parry Sound District	first recorded here in 1981; severe defoliation expanded south to Twelve Mile Bay	C
		Chatham and Wingham districts	up to 70% defoliation from Grand Bend to Pinery Provincial Park, and small pockets of severe defoliation as far north as Bayfield; a total of 3000 ha	
		Northeastern, Central and Eastern regions	scattered pockets of low-to-moderate numbers	
Red pine cone beetle **Conophthorus resinosae** Hopk.	red pine	CFB Borden, Huronia District	numerous affected shoots on understory trees	C
		Temagami District	Heavy infestations recurred and caused varying degrees of damage to red pine plantations and seed orchards.	
		Baltimore, Lindsay District	high level of damage to red pine cones in a seed production area	
Red pine sawfly **Neodiprion nanulus nanulus** Schedl.	red pine jack pine	North Central Region	plentiful at one location in Thunder Bay District but otherwise scarce	B
		Northeastern Region	High numbers caused severe defoliation in many areas throughout the region.	
Saddled prominent **Heterocampa guttivitta** (Wlk.)	sugar maple red oak	central Ontario	light-to-moderate defoliation in Awenda Provincial Park, Huronia District and very light defoliation persisting in Proudfoot Twp, Bracebridge District	A
Satin moth **Leucoma salicis** (L.)	silver poplar (**Populus alba** L.)	Eastern Region	heavy defoliation on four ornamental trees in Thurlow Twp, Napanee District--a westerly extension of 60 km to the known range of this insect	B

cont'd.

OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd.)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Sawyer beetles **Monochamus spp., mostly acutellatus (Say)**	jack pine black spruce white spruce eastern white cedar	Redditt, Kenora District	severe damage and tree mortality caused by adult feeding on the fringe trees bordering harvested areas	A
		Northern and North Central regions	moderate-to-heavy damage in the Thunder Bay area and Chapleau; light flagging of white cedar and white spruce in Warren Township, Chapleau District and Barbara Lake SPA in the Terrace Bay District	
Shoot blight **Sirococcus strobilinus Preuss**	red pine	Dryden and Sioux Lookout districts	low incidence of infection noted	A
Venturia macularis (Fr.) Müller & Arx	trembling aspen	province-wide	infections generally lower than in 1981 but high in Northwestern Region where an increase in excess of 30% was noted	A
Shorthorned oakworm **Anisota finlaysoni Riotte**	white oak bur oak	Front of Leeds and Front of Escott twps, Brockville District, and Camden Twp, Napanee District	heavy defoliation of fence-row trees	A
		Wolf Island, Napanee District	light damage on fence-row trees	
Solitary oak leafminer **Cameraria hamadryadell (Clem.)**	bur oak red oak white oak	Eastern Region	heavy defoliation throughout the region	B
		Brantford	moderate numbers south of town	
Spearmarked black moth **Rheumaptera hastata (L.)**	white birch yellow birch	Lake Superior Provincial Park and Northeastern Region	Large numbers of adults seen in the park in June failed to produce a heavy infestation. Low numbers of larvae were seen from Wawa to Blind River.	B

cont'd.

OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd.)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Spearmarked black moth (cont'd.)		Northern Region	Moderate-to-severe defoliation dropped from 9900 km^2 in 1981 to 4100 km^2 in 1982 and was confined to the southern Chapleau District. The area reported in 1981, 7729 km^2, has been revised to 9900 km^2. The decline may be due, in part, to a microsporidial disease.	
Spruce bud moth *Zeiraphera canadensis* Mut. & Free.	white spruce	Seed Production Area, Simcoe District, St. Williams	moderate damage to new growth; populations declining	B
Spruce gall adelgid *Adelges laricistatus* (Patch)	white spruce European larch	Fort Frances and Dryden districts	low-to-moderate damage	B
		Port Rowan, Simcoe District	heavy infestation on larch needles	
Spruce needle rusts *Chrysomyxa ledi* (Alb. & Schw.) d By.	spruce	northern Ontario	high incidence in a number of plantations but very low level of infection, lower than in 1981	B
Chrysomyxa ledicola Lagh.				
Striped alder sawfly *Hemichroa crocea* (Geoff.)	alder white birch	Northwestern and Northern regions	moderate-to-severe in Fort Frances, Cochrane and Kapuskasing districts	C
		Beausoleil Island, Huronia District	heavy defoliation on scattered white birch trees	
Sweetfern blister rust *Cronartium comptoniae* Arth.	jack pine	Northeastern and Northwestern regions	Evaluations in host plantations revealed that infection levels had increased over those noted in 1981.	A
Twoleaf tier *Pailocerasia reflexella* Clem.	trembling aspen oak	eastern Ontario	common at low levels, but contributed to defoliation of 646 ha of aspen in Snowden Twp, Minden District	C

cont'd.

OTHER NOTEWORTHY INSECTS AND DISEASES (cont'd.)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Variable oakleaf caterpillar **Heterocampa manteo** (Dbldy.)	basswood	Fort Frances District Provincial Park	heavy defoliation in Lake of the Woods	C
		Owen Sound District	small numbers in Keppel and Sydenham townships	
Walnut caterpillar **Datana integerrima** G. & R	shagbark hickory bitternut hickory black walnut butternut	Eastern, Central and South-western regions	virtual collapse of populations through most of area, but very heavy defoliation on hickory on Wolfe Island and Napanee District in the Toledo area of the District	B
White pine blister rust **Cronartium ribicola** J.C. Fisch.	eastern white pine	province-wide	common at trace levels and causing some mortality in young plantations	A
White pine weevil **Pissodes strobi** (Peck)	eastern white pine jack pine red pine white spruce Mugho pine black spruce Norway spruce	province-wide	Populations remained low in northern Ontario except for 30%-60% leader damage in the Northeastern Region. Populations in southern Ontario remained generally high with pockets of 30-40% leader damage in the Huronia District.	A
Woolly alder aphid **Paraprociphilus tessellatus** (Fitch)	sugar maple silver maple alder	northern Ontario	moderate-to-heavy infestations	B
Yellowheaded spruce sawfly **Pikonema alaskensis** (Roh.)	white spruce black spruce	northern Ontario	pockets of moderate-to-severe defoliation throughout the north	A
		southern Ontario	light-to-moderate defoliation; populations declined to endemic levels in Cardiff Twp, Bancroft District	
Yellownecked caterpillar **Datana ministra** (Dru.)	white birch basswood willow	Kingston, Belleville and Newcastle areas	heavy defoliation on fence-line trees	C

cont'd.

OTHER NOTEWORTHY INSECTS AND DISEASES (concl'd.)

Insect or Disease	Host(s)	Locality	Remarks	Rating
Yellownecked caterpillar (cont'd.)		southern Ontario, Northwestern Region and Atikokan District, North Central Region	generally low numbers and scattered colonies	
Yellow witches' broom *Chrysomyxa arctostaphyli* Diet.	spruce	Geraldton and Terrace Bay districts	low levels of infection in scattered areas in these districts	B
Zimmerman pine moth *Dioryctria zimmermani* (Grt.)	red pine	Uxbridge Twp, Maple District and Tosorontio Twp, Huronia district	occasional moderately infested trees in these townships; a general decline in populations	C
ABIOTIC				
Frost	spruce aspen	northern Ontario	scattered damage to white spruce with up to 25% of new shoots affected; up to 5% of new shoots of black spruce affected; in Foleyet Twp, one area of trembling aspen received 100% damage	
Hail	sugar maple yellow birch beech	Sinclair Twp, Bracebridge District	A storm in mid-June caused complete defoliation of 905 ha of mature trees	
Snow	jack pine aspen	Northwestern and North Central regions	A wet, heavy snow fell on these regions in the fall of 1981 causing considerable breakage of branches and stems. In the Northwestern Region approximately 9,000 km^2 were affected.	
Wind	jack pine black spruce white birch aspen	northern Ontario	Severe wind damage was reported from all northern regions, the most serious being in the Northwestern Region where 4,500 ha were affected and extensive damage was done to 63,800 cunits of merchantable wood.	